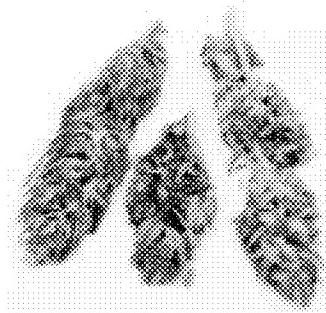


# EXAMINATION OF DRUGS OF ABUSE

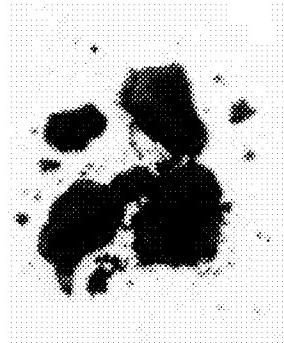
## Gross Visual Examination

Plant material is typically sufficiently distinctive to enable identification.

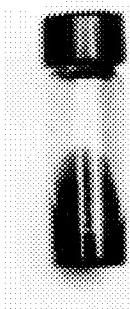
- Cannabis
- Mushrooms
- Peyote (cactus)
- Admixed with a powdered drug



Marijuana



Hashish

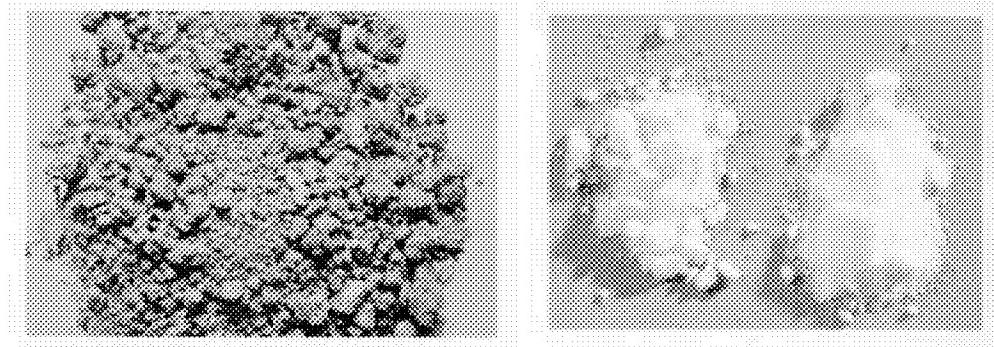


Hashish Oil

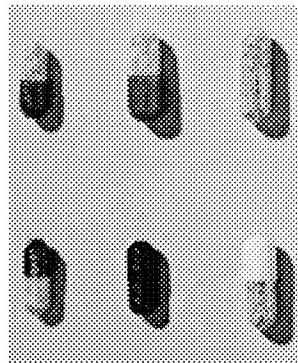


Psilocybe Cubensis

Non-plant drugs are more difficult to visually distinguish and include:



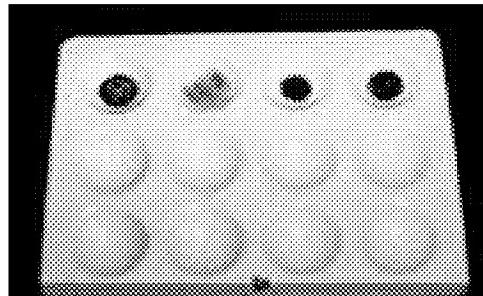
- **Tablets** (sometimes distinguishable by pressing marks/colour) and **Capsules**. Legitimate pharmaceutical products are easily identifiable through drug reference texts.



- **Liquids** Usually solvents or psychoactive substances - Hash Oil, PCP, or LSD, Cocaine in liquid form for either transport or reduction into Crack; Heroin may be found as a liquid prior to injection.

## **Chemical Spot (Screening) Tests**

Colour-generating chemical spot tests will not identify a specific substance, but can be used to distinguish classes of drug which react in the same fashion.

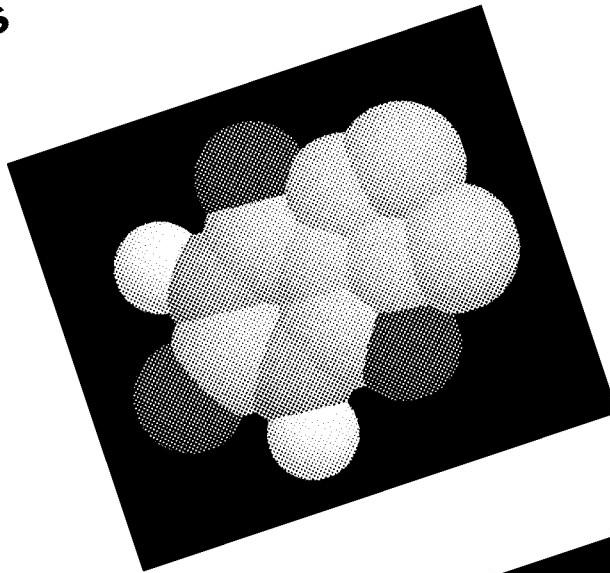
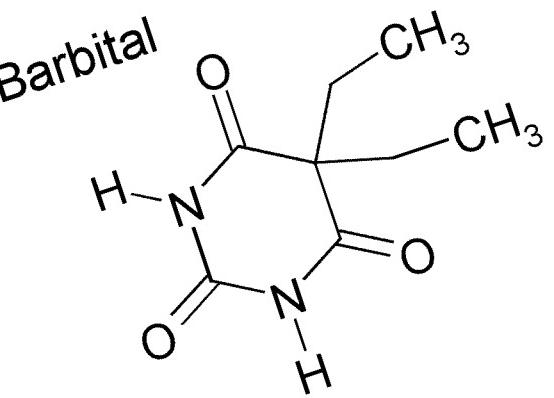


### **Spot tests (reagents) include:**

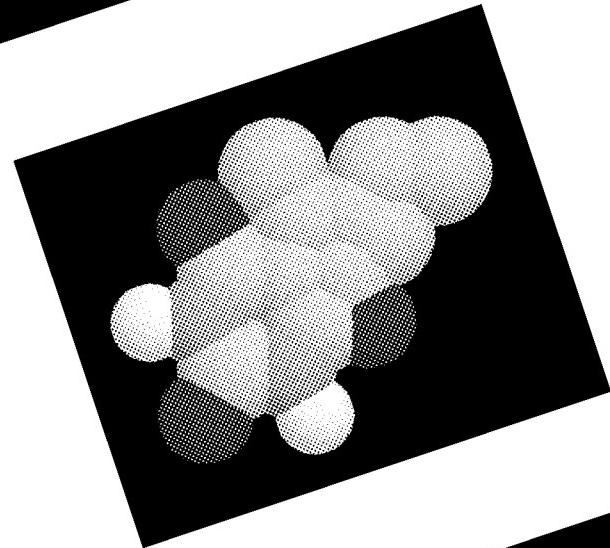
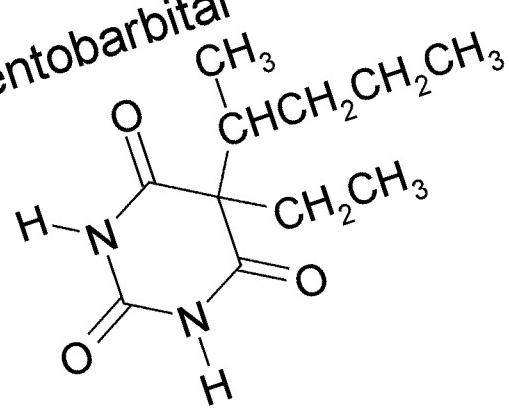
<b>Reagent</b>	<b>Principle Drug</b>
• Dille-Kopppanyi	Barbiturates
• Duquenois-Levine	Cannabinoids
• Ehrlich's	Hallucinogens
• Froehde's	Pentazocine
• KN	Cannabinoids
• Mandelin	Amphetamines
• Marquis	Opiates
• Mayer's	General
• Mecke's	Meth/Amphetamines
• Nitric Acid	Heroin/Morphine
• Scott's	Cocaine
• Simon's	Methamphetamines
• Ephedrine	
• Valium/Diazepam	

Dille-Koppannyi Reagent  
A Spot Test for Barbiturates

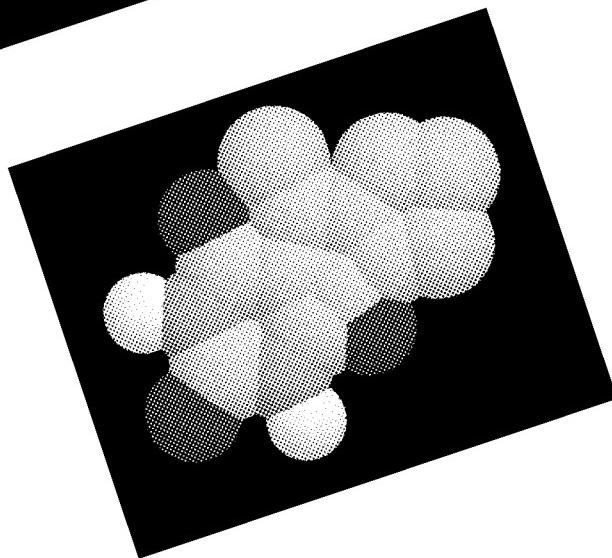
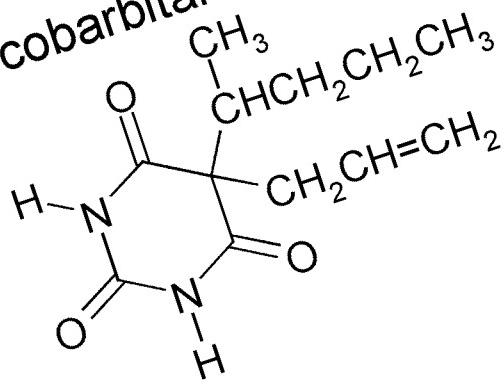
Barbital



Pentobarbital



Secobarbital



Folk\_OIG\_PRR\_007300

# Dille-Koppannyi Reagent

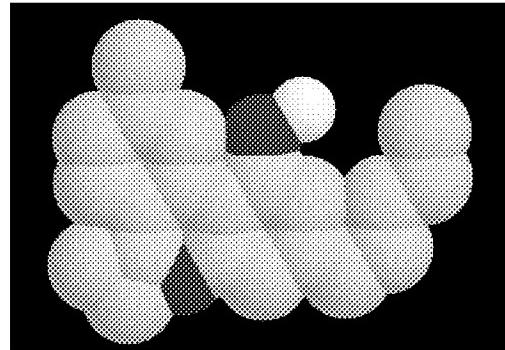
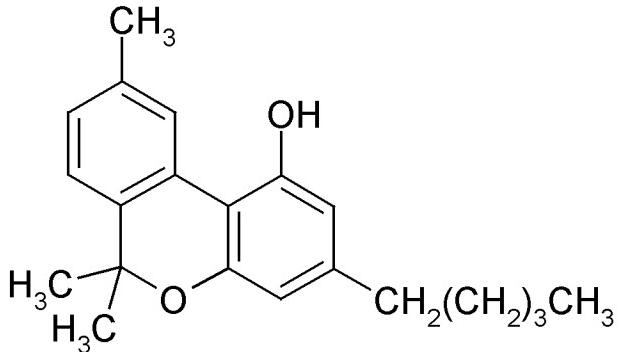
## A Spot Test for Barbiturates

- Solution 1 1% cobalt acetate in methanol  
 $\text{Co}(\text{C}_2\text{H}_3\text{O}_2)_2$
- Solution 2 5% isopropylamine in methanol  
 $\text{CH}_3\text{CH}(\text{CH}_3)\text{NH}_2$
- Positive Barbiturates - lavender-blue

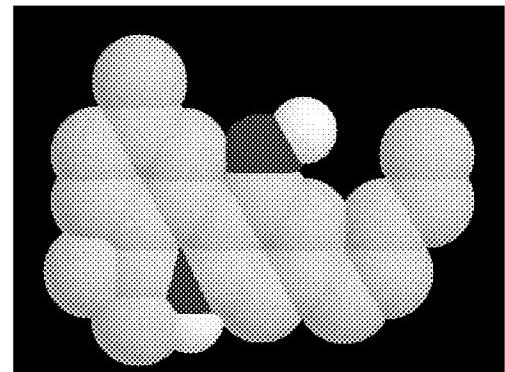
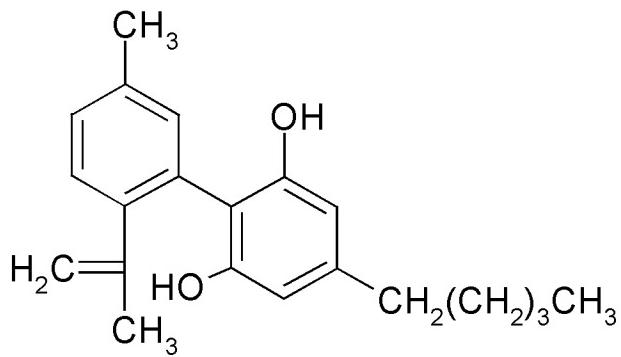
## Duquenois-Levine Reagent

A Spot Test for Cannabis - Marijuana; Hashish; Hashish Oil and Cannabinoids.

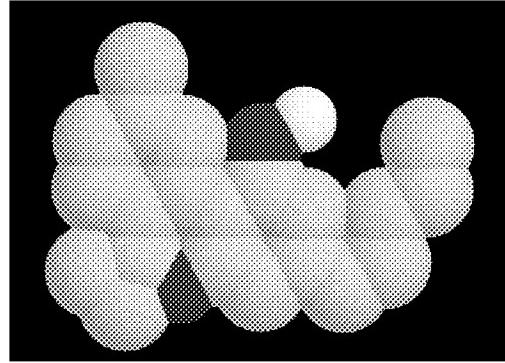
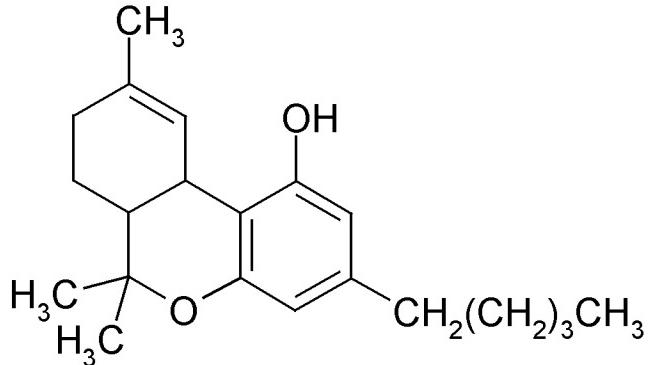
Cannabinol



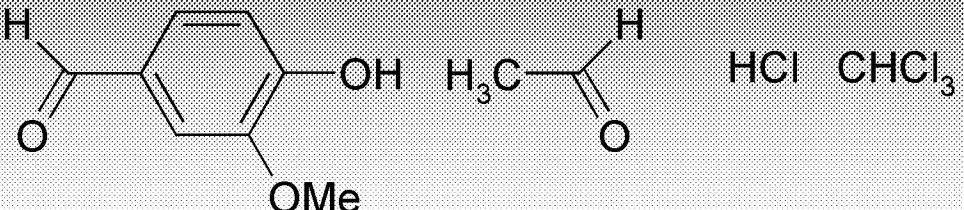
Cannabidiol



Δ<sup>9</sup>-Tetrahydrocannabinol



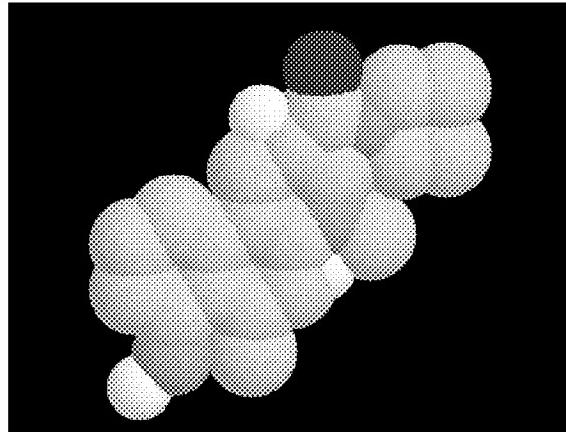
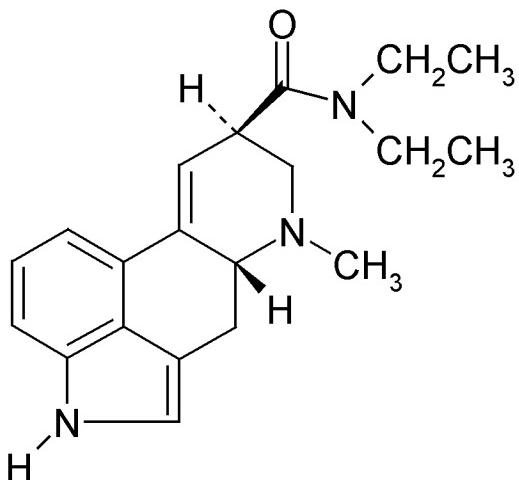
## Duquenois-Levine Reagent

Solution 1	2% vanillin & 1% ethanal
Solution 2	concentrated HCl
Solution 3	chloroform
 <p>The diagram shows the chemical structures of vanillin and ethanal, along with their reagents. Vanillin is a benzylideneacetophenone derivative with a methoxy group (OMe) at the para position of the phenyl ring. Ethanal is a simple aldehyde. To the right, the chemical formulas for HCl and CHCl<sub>3</sub> are shown.</p>	
<ul style="list-style-type: none"><li>• <b>Positive Marijuana</b> – purple/black</li></ul>	

## Ehrlich's Reagent (Van Urk's Reagent)

### A Spot Test for LSD, psilocin and psilocybin

LSD

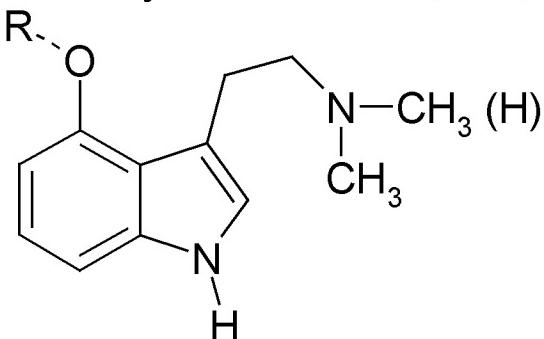


*d*-lysergic acid diethylamide (LSD) is a synthetic chemical derived from ergot alkaloids which are produced by the ergot fungus which grows on rye.

Psilocin      4-hydroxy-N,N-dimethyltryptamine

Psilocybin      4-phosphoryloxy-N,N-dimethyltryptamine

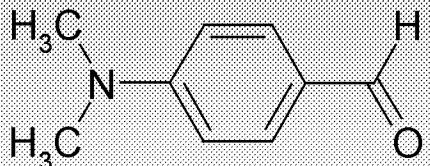
Baeocystin      4-phosphoryloxy-N-methyltryptamine



The indoles psilocin, psilocybin and baeocystin are obtained from magic mushrooms.

## Ehrlich's Reagent (Van Urk's Reagent)

- \* Solution 1 1% *p*-dimethylaminobenzaldehyde  
in 10% HCl (aq) (H<sub>2</sub>SO<sub>4</sub> (aq))



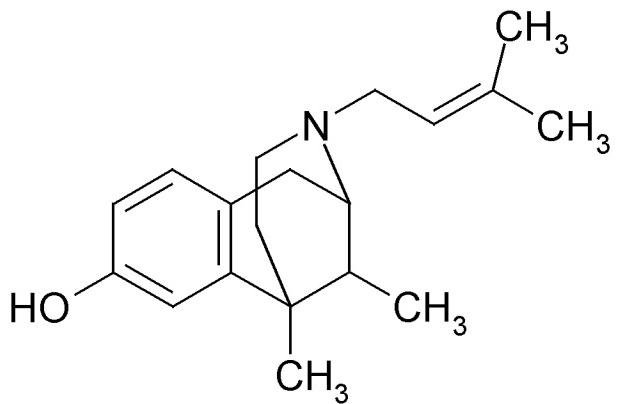
- \* Positive      **LSD** - purple  
**Psilocin** - blue-grey  
**Psilocybin** - red-brown

# Froehde's Reagent

## A Spot Test for Opioids

Pentazocine (Talwin)

2-dimethylallyl-5,9-dimethyl-2'-hydroxy-6,7-benzomorphan

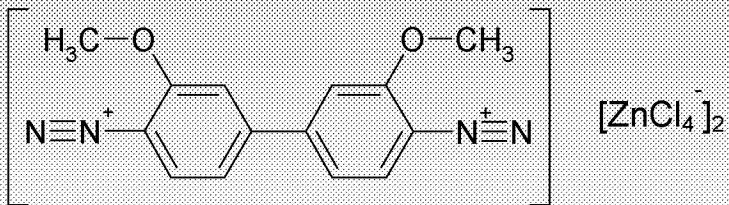


- Solution 1 0.5 g molybdic acid or sodium molybdate  $[Na_2MoO_4]$  in 100 ml conc.  $H_2SO_4$ .
- Positive      Opioids - pink

## **KN (Fast Blue B Salt) Reagent**

**A Spot Test for Cannabis - Marijuana; Hashish; Hashish Oil and Cannabinoids.**

- Solution 1 Fast Blue B salt

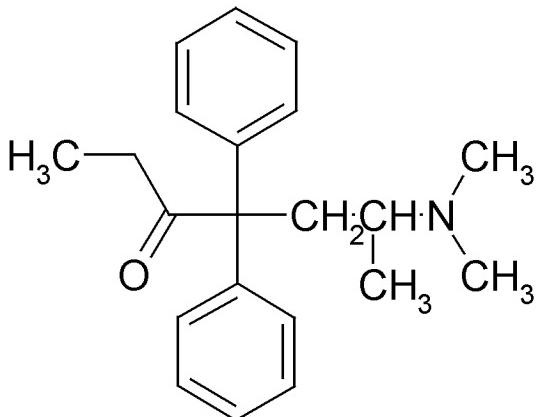


- Positive      **Cannabinoids - Reddish-purple**

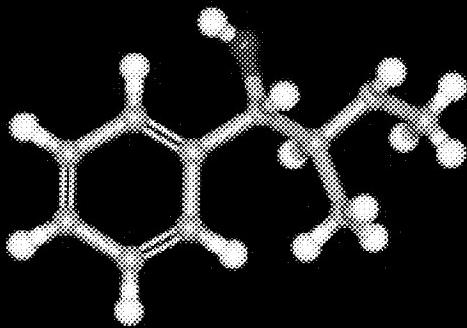
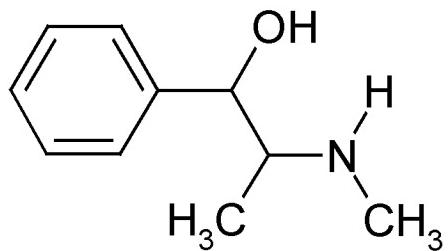
# Mandelin Reagent

A Spot Test for Alkaloids and Amphetamines.

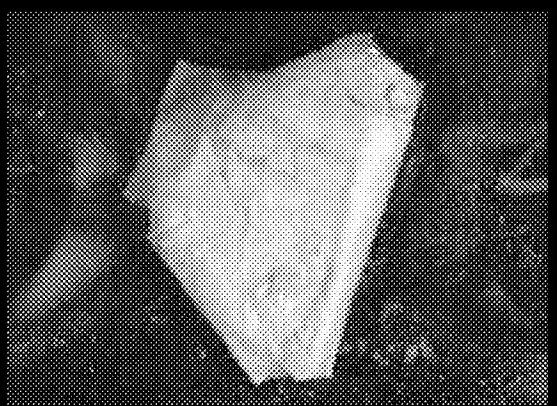
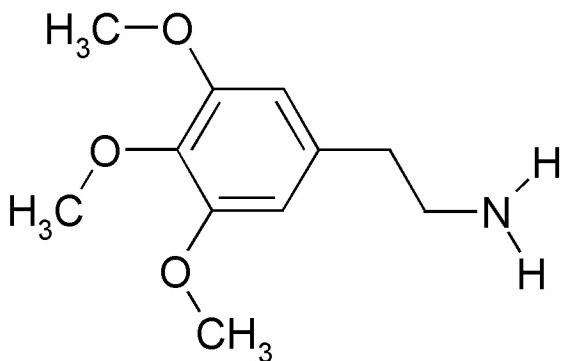
Methadone



Ephedrine



Mescaline



## Mandelin Reagent

### A Spot Test for Alkaloids and Amphetamines.

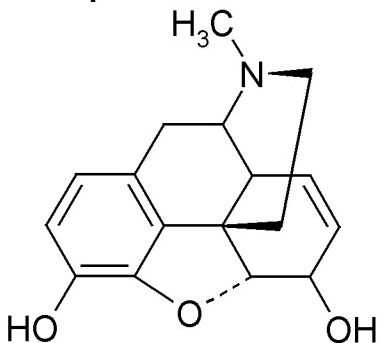
- Solution 1 1% ammonium vanadate  
[NH<sub>4</sub>VO<sub>3</sub>] in conc. H<sub>2</sub>SO<sub>4</sub>  
(sg: 1.84)
- Positive Ephedrine sulphate - brick-red  
Mescaline hydrochloride -  
Orange turning to Yellow or  
Green

# Marquis Reagent

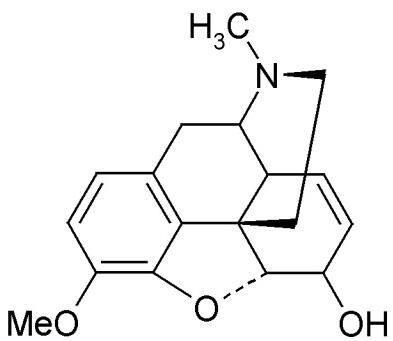
A Spot Test for Narcotic analgesics and  
Meth/Amphetamines

## Opiates

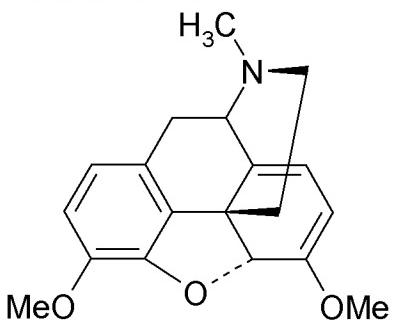
### Morphine



### Codeine



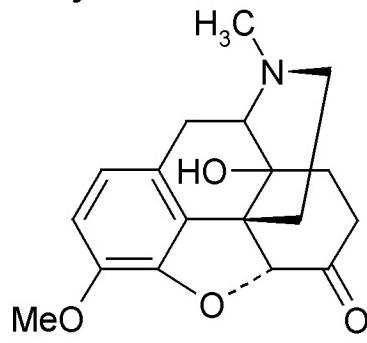
### Thebaine



### Papaverine, Narcotine, Porphyroxine

## Opioids

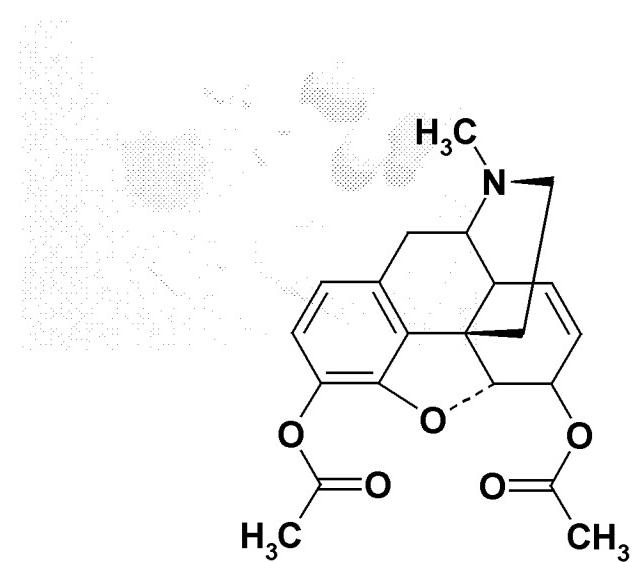
### Oxycodone



### Hydrocodone, Methadone

### Heroin

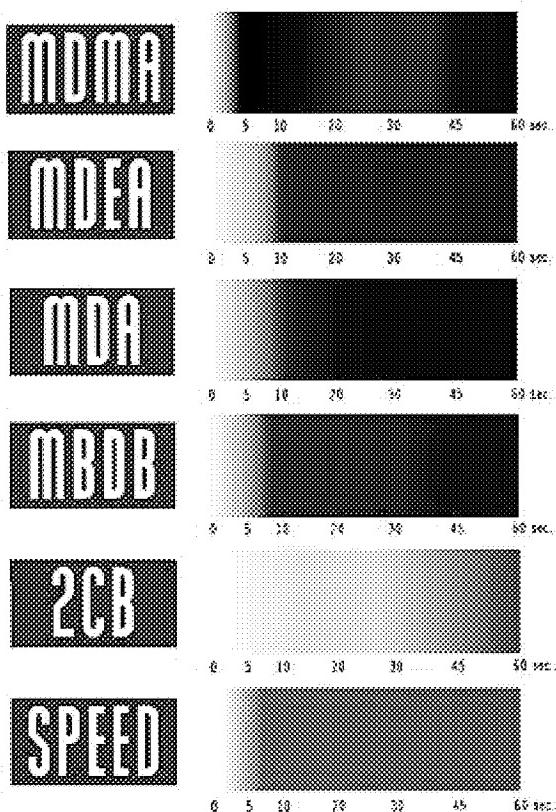
### diamorphine/diacetylmorphine



## Marquis Reagent

- Solution 1 40% formaldehyde (aq) in 100 ml.  
conc. H<sub>2</sub>SO<sub>4</sub> (sg: 1.84)
- Positive most opium derivatives - purple  
methamphetamines and  
amphetamines – dark purple to  
yellow

### Some colours obtained in the Marquis tests for Meth/Amphetamines

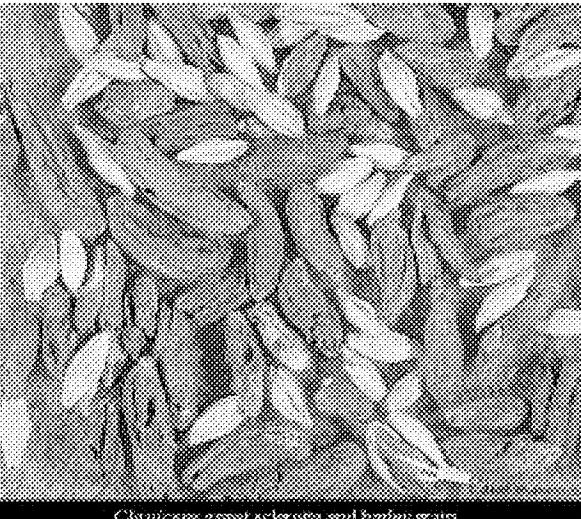


## Marquis Reagent - Other colours

2C-T-2	Orange to Red (usually a sort of salmon colour)
2C-T-7	Orange to Red (salmon, again; also, there is less tendency towards orange than 2C-T-2 shows)
4-Acetoxy-DiPT	Dirty (blackish) olive
4-MTA	No colour change
5-MeO-DiPT	Fizzes then turns yellow quickly changing to a slightly rusty orange
Alpha-Methyl-DiPT	Fizzes then turns brown
AMT	Dark brownish-yellow
Benzylpiperazine	No colour change, but it causes the reagent to fizz. Looks like when you pour hydrogen peroxide on a cut.
DiPT	Fizzes strongly then turns a neon yellow
DPT	Dirty olive
Opiates	Pink to Purple
Phenolphthalein	Crimson
PMA	No colour change
Harmine	Fizzes slightly, much less so than BZP, and turns a brown-orange rust colour.
Yohimbine	Fizzes slightly, much less so than BZP. Slowly (up to a minute), it will turn an olive green colour.

# Mayer's Reagent

## A General Spot Test for Alkaloids

Narcotic Alkaloids	Morphine; Heroin
<p>Cocaine</p>  <p><small>Coca leaves, ergot scleroma and barley grain from Texas State University</small></p>	<p>Methyl-benzoyl-ecgonine</p> <chem>CC(=O)C1(CCN(C)C1)COc2ccccc2</chem> <p>Benzoyl-ecgonine</p> <chem>CC(=O)C1(CCN(C)C1)OC(=O)c2ccccc2</chem> <p>Ecgonine</p> <chem>CC(=O)C1(CCN(C)C1)O</chem>
<p>Other Ergot Alkaloids</p> <ul style="list-style-type: none"><li>Ergotamine</li><li>Ergosine</li><li>Ergovaline</li><li>Ergostine</li><li>Ergocornine</li><li>Ergocristine</li></ul>	

# Mayer's Reagent

## A General Spot Test for Alkaloids

- Solution 1 Potassium mercuric-iodide [KHgI]  
(aq)
- Positive **Cream-coloured precipitate**

## **Mecke's Reagent**

### **A Spot Test for Meth/Amphetamines and all types of Heroin**



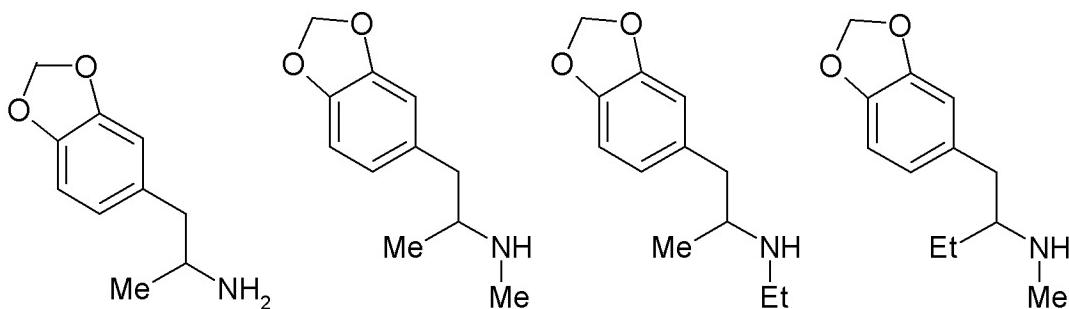
#### **Ecstacy tablets**

- MDA
- MDMA
- MDEA
- MBDB
- 2CB
- Speed

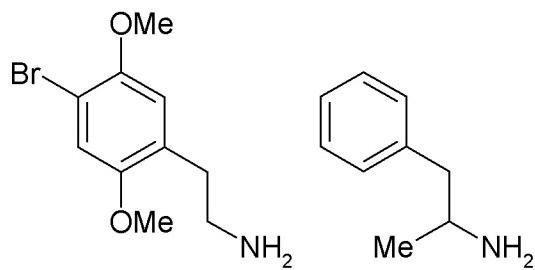
## Mecke's Reagent

### A Spot Test for Meth/Amphetamines and all types of Heroin

- MDA 3,4-methylenedioxymethamphetamine
- MDMA methylenedioxymethylamphetamine
- MDEA methylenedioxymethylamphetamine
- MBDB N-methyl-1-(1,3-benzodioxol-5-yl)-2-butanamine



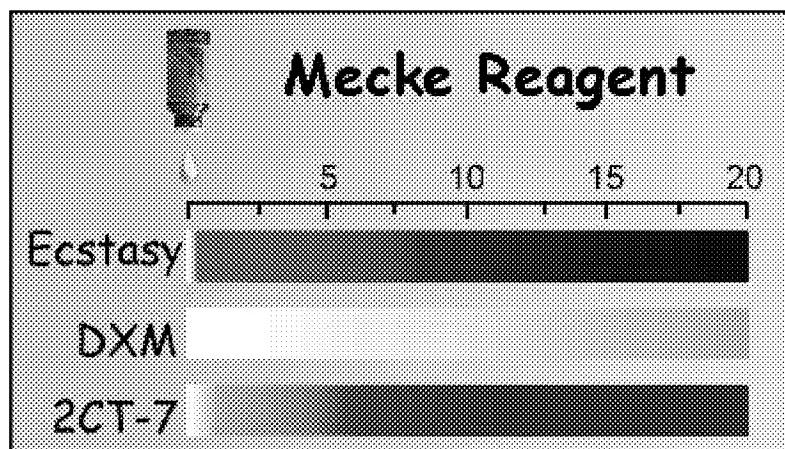
- 2CB 4-bromo-2,5-dimethoxyphenethylamine
- Speed *d,l*-α-methylphenethylamine (amphetamine)



## Mecke's Reagent

### A Spot Test for Meth/Amphetamines and all types of Heroin

- Solution 1 1 g. selenious acid in 100 ml. conc.  $\text{H}_2\text{SO}_4$  (sg: 1.84)
- Positive rapidly turns **dark green/turquoise** and then **dark blue (almost black)**

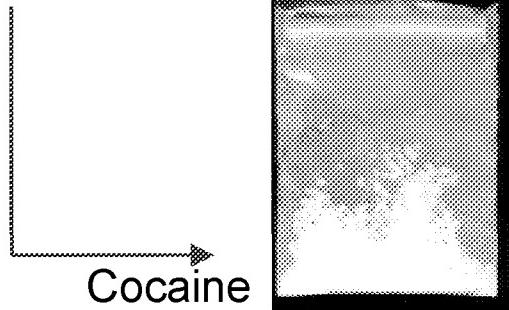


# Scott's Reagent

## A Spot Test for Cocaine and some Synthetic Anaesthetics

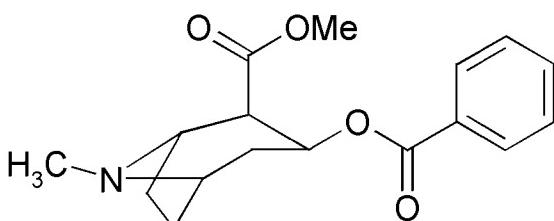


Coca plant

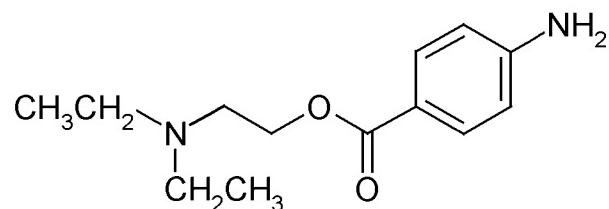


### Cocaine

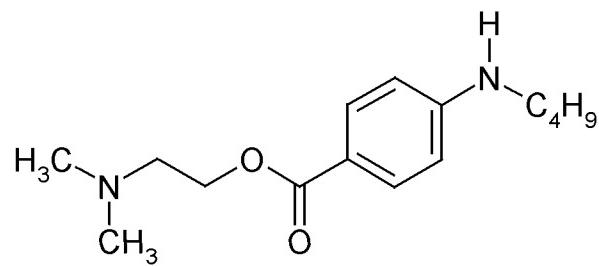
Cocaine is a naturally derived CNS (central nervous system) stimulant extracted and refined from the Coca plant.



### Procaine



### Tetracain



## Scott's Reagent

### A Spot Test for Cocaine and some Synthetic Anaesthetics

- \* Solution 1 2% cobalt thiocyanate  $[\text{Co}(\text{SCN})_2]$  in water and glycerine (1:1)
- \* Solution 2 Conc. HCl
- \* Solution 3 Chloroform
  
- \* Positive
  - Powdered cocaine turns solution A **blue**
  - Colour turns **pink** on adding solution B
  - **Blue** colour appears in the chloroform layer on adding C.

# Simon's Reagent

## A Spot Test for Methamphetamines

- Solution 1 1 g sodium nitroprusside [Na<sub>2</sub>Fe(CN)<sub>5</sub>NO] and 2 ml acetaldehyde in 50 ml water.
- Solution 2 2% (w/v) sodium carbonate (aq).
- Positive dark blue

